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09/658550

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Dated: 8 September 2000

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20JUL00 E554138-4 D00107  
P01/7700 0.00-0017672.7

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The Patent Office

Cardiff Road  
Newport  
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NP10 8QQ**Request for grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

## 1. Your reference

N00/0526/GB

**0017672.7**

## 2. Patent application number

(The Patent Office will fill in this part)

20 JUL 2000

3. Full name, address and postcode of the or of each applicant (*underline all surnames*)Reflective Technology Industries Limited  
Road One  
Winsford Industrial Estate  
Winsford  
Cheshire CW7 3QQPatents ADP number (*if you know it*)

Great Britain

644 9227003

If the applicant is a corporate body, give the country/state of its incorporation

## 4. Title of the invention

Chroma-keying

5. Name of your agent (*if you have one*)Address for service in the United Kingdom to which all correspondence should be sent  
(including the postcode)McNeight & Lawrence  
Regent House  
Heaton Lane  
Stockport  
Cheshire SK4 1BSPatents ADP number (*if you know it*)

0001115001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (*if you know it*) the or each application number

Country

Priority application number  
(*if you know it*)Date of filing  
(day / month / year)

## 7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

## 8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

Yes

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

See note (d))

9. Enter the number of sheets for any of the following items you are filing with this form.  
Do not count copies of the same document

Continuation sheets of this form

Description

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Claim(s)

Abstract

Drawing(s)

- 
10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patents Form 9/77*)

Request for substantive examination  
(*Patents Form 10/77*)

Any other documents  
(please specify)

- 
11. I/We request the grant of a patent on the basis of this application.

Signature

Date 19.7.00

McNeight & Lawrence

- 
12. Name and daytime telephone number of person to contact in the United Kingdom

David L McNeight 0161 480 6394

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- a) If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- b) Write your answers in capital letters using black ink or you may type them.
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- d) If you have answered 'Yes' Patents Form 7/77 will need to be filed.
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### Chroma-Keying

This invention relates to chroma-keying, by which is meant the technique, used in film-making and video imaging, of superimposing a foreground image shot by a camera on to a background which has been previously recorded or which is generated by a computer.

Until recently, chroma-keying involved the use of a coloured backdrop, the electronics behind the system using the backdrop colour as a key (hence the name) to define the area of an imposed image from another filming or from a computer-generated background image. In GB 2321814 and GB 2321565 is disclosed a technique for chroma-keying in which a backdrop is retroreflective, by virtue of comprising microbeads having a hemispherical metal coating, illuminated by a source of coloured light close to the camera axis. The light is reflected straight back to the camera by the microbeads, and a very low intensity of light is required, e.g. from a ring of light emitting diodes surrounding the camera lens, which light has negligible effect on the foreground image. This is in contrast to conventional chroma-keying, which requires a high intensity of illumination to provide a sufficient signal from the backdrop to activate the electronic system. Such high intensity illumination is desirably avoided, since it makes a television studio hot to work in and even gives rise to a fire hazard, quite aside from the power cost involved. Moreover, it meant that chroma-keying could really only be carried out in the context of a professional studio.

The technique disclosed in the patent applications aforementioned, however, places substantial demands on the nature of the backdrop. Conventional retroreflective coatings for e.g. flexible backdrop fabrics are inadequate because of relatively fast fall off of retroreflectivity with angle of incidence, and a special backdrop had to be devised in

which surface roughness played an important role in levelling out, at least to some extent, the retroreflectivity over wider ranges of angle of incidence.

While this new technique dispenses with the need for very high levels of studio lighting, it relies on the presence of a light source close to the camera, usually provided in the form of a ring of bright light emitting diodes, and this can be expensive and inconvenient.

The present invention provides a method for chroma-keying and a backdrop material therefor which do not suffer these disadvantages.

The invention comprises a method for chroma-keying comprising deploying a backdrop of coloured material with retroreflective elements and imaging with a camera a scene against a backdrop with the backdrop principally illuminated with light from a source or sources away from the camera axis.

The backdrop and the scene may also, however, be illuminated with light of the same colour as the backdrop from a source close to the camera axis. In other words, the technique of the patents aforementioned does not have to be totally abandoned, rather, it is unnecessary, but can be used to sharpen up the image, the important thing being that a chroma-keying signal can be produced without the use of a light source on the camera axis and without the use of high intensity, off-axis lighting.

The backdrop colour may be blue - the conventional chroma-keying (old technology) colour, or it may be green, green having the advantage that it will readily separate from the background people, e.g. in a news interview, who tend to wear more blue than green. As is made clear in the patents aforementioned, however, any colour can be used as a chroma-keying colour.

The use of retroreflective elements in the material appears to have the effect of intensifying the backdrop colour as seen by the camera, perhaps because they direct light from such illumination sources as are located off the camera axis back towards the sources themselves, leaving only light scattered from the backdrop colourant to reach the camera lens. In any event, with coloured and retroreflective backdrop material, no on-axis light is needed, and very much lower intensities of off-axis lighting are required than would be the case with non-retroreflective material.

The invention also comprises a backdrop material for chroma-keying comprising a coloured material with retroreflective elements, the material having a smooth surface.

The material may be a flexible sheet material such as a textile fabric.

The retroreflective elements may be hemispherically metallised microbeads, as in the patents aforementioned. In those patents, the surface of the backdrop material was required to be rough, so as to present more of the microbeads to light incident obliquely on the material, so as to give a more even apparent illumination to the backdrop over large areas, for effective chroma-keying. The material of the present invention does not need to be especially rough, as it is not required to retroreflect back to the camera.

It is also found that chroma-keying can be successfully carried out using retroreflective material as a backdrop in a manner which facilitates auto-cueing. It is a disadvantage of retroreflective chroma-keying that the light source, usually a ring of bright led's around the camera lens, precludes the use of an autocue, as it shines straight at the eyes of the person reading same.

The invention also comprises a method for chroma-keying comprising deploying a backdrop of material with retroreflective elements and imaging with a camera a scene

against the backdrop with the backdrop illuminated with a chroma-keying light source disposed off the camera axis to an extent which does not impede auto-cueing.

The material may be coloured, and the material and chroma-keying light source may be the same colour.

The light source may be placed up to one metre away from the camera lens, where it will not interfere with the autocue, and effective chroma-keying is still possible.